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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,722	12/31/2003	Himanshu Pokharna	42.P18070	1381

8791 7590 10/25/2004

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EXAMINER

DUONG, THO V

ART UNIT	PAPER NUMBER
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3743

DATE MAILED: 10/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,722

Applicant(s)

POKHARNA ET AL.

Examiner

Tho v Duong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: on page 2, paragraph 0002, at line 2, "plat" appears to be a typographical error of "plate".

Appropriate correction is required.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the claimed subject matter of "the plate includes a set of micro channels" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified

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and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10,12-22,24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton et al. (US 5,763,951) in view of Bonsignore et al. (US 6,432,320). Hamilton discloses (figures 2-5,8) a system comprising a thermal conductive plate (108) including a set of micro channels (116), to be placed in contact with a chip set (100); a fluid loop coupled to the plate to circulate fluid and have the fluid absorb heat from the plate; the fluid loop is coupled to a heat exchanger (110); an electromagnetic pump (114) to circulate the fluid through the fluid loop. Hamilton does not disclose that the heat exchange fluid contains water and nanoparticles. Bonsignore discloses (column 3, line 21-column 4, line 18 and column 8, lines 1-15) an improved heat transfer medium that can be used in a microprocessor cooling system, wherein the heat transfer medium contains a fluid, which may be a single fluid or a two phase fluid, and magnetic nano-particles such as iron nano-particles for the purpose of increasing thermal capacity and heat transfer rate of a heat transfer system while minimizing pump energy requirement. Since Hamilton and Bonsignore are both from the same field of endeavor and/or

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analogous art, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use Bonsignore's teaching in Hamilton's system for the purpose of increasing thermal capacity and heat transfer rate of a heat transfer system while minimizing pump energy requirement.

Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton and Bonsignore as applied to claims 1-10,12-22,24-28 above, and further in view of Cannell et al. (US 6,729,383). Hamilton and Bonsignore substantially disclose all of applicant's claimed invention as discussed above except for the limitation that the fluid is deionized water. Cannel discloses (figure 1 and column 19, lines 22-28) a fluidly cooling system wherein deionized water is selected to be the fluid for the purpose of providing a coolant with low cost, low corrosivity, simplicity of design and non-health hazard. Since Hamilton, and Bonsignore and Cannel are both from the same field of endeavor and/or analogous art, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use Cannel's teaching in the combination device of Hamilton and Bonsignore for the purpose of providing a coolant with low cost, simplicity of design, low corrosivity and non-health hazard.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hsu (US 2004/0182099A1) discloses a device and method for ferrofluid power generator and cooling system.

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Goodson et al. (US 20030062149A1) discloses an electroosmotic micro channel cooling system.

Ziolo et al. (US 5,641,424) discloses a magnetic refrigerant composition.

Withers et al. (US 6,695,974) discloses a nano carbon material for enhancing thermal transfer in fluids.

Momoda et al. (US 6,447,692) discloses nanometer sized phase change materials for enhanced heat transfer fluid performance.

Bingler (US 2003/0209343A1) discloses a pump system for use in a heat exchange application.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Tho Duong whose telephone number is (703) 305-0768. The examiner can normally be reached on from 9:30-6 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennet, can be reached on (703) 308-0101. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0861.

TP

TD

October 6, 2004



Tho Duong

Patent Examiner.